Costs and Health Care Resource Utilization of Liposomal Bupivacaine and Ropivacaine in Total Knee Arthroplasty in the Hospital Outpatient Department: a Propensity Score Matched Cohort Study

Gabriel Wong,[1,*] Daniel Goltz,[2] Jennifer Lin[1]

*Affiliation at time of study.

[1]Pacira BioSciences Inc., Brisbane, CA; [2]Academic Orthopaedic Network, Cary, NC

Presenting Author: Jennifer Lin; Jennifer.lin@pacira.com

OBJECTIVE

To evaluate the real-world effectiveness of liposomal bupivacaine (LB) versus ropivacaine in total knee arthroplasty (TKA) on healthcare resource utilization (HCRU) from the index surgery day through the 30 days after the surgery day

CONCLUSIONS

1 The use of LB was associated with significantly lower total costs compared with ropivacaine for TKA in hospital outpatient care centers among patients covered by commercial and Medicare Advantage (MA) insurance

2 LB is a cost-effective strategy in outpatient care for TKA procedures; LB treatment resulted in lower home healthcare utilization (HHU) and outpatient and home healthcare costs compared with ropivacaine, regardless of insurance cohort

INTRODUCTION

- TKA is a common surgical procedure aimed at alleviating pain in patients with severe osteoarthritis of the knee[1-3]
- Postoperative pain management is crucial for patient recovery and overall outcomes[1-3]
- Traditional local anesthetics used for TKA, such as bupivacaine and ropivacaine, provide <12 hours of analgesia, with patients often requiring supplementary pain medication[1]
- LB, a sustained-release formulation of bupivacaine, offers prolonged pain relief compared with these traditional methods[1,3]
- Effective postoperative pain control with LB may help reduce overall healthcare costs by facilitating earlier functional recovery[3]

METHODS

- This retrospective cohort study used deidentified patient data from NorstellaLinQ, a nationwide US closed claims database, from January 2020 until March 2025
- The index date was the day of TKA in the hospital outpatient department
  - Propensity score matching (1:1 ratio) was conducted between the LB and the ropivacaine group for each payor cohort based on age, sex, race, region, year of surgery, comorbidities, and medical costs 6 months before the index surgery
- Mean total costs per patient were assessed inclusive of the index surgery through the 30-day follow-up
- Mean HCRU per patient visit was assessed from the index surgery through the 30-day follow-up
  - Percent HCRU of inpatient admission, emergency department (ED) visits, long-term care (LTC), and home healthcare were similarly assessed
- Differences between groups were analyzed using chi-square test for categorical variables and Wilcoxon rank-sum test for continuous variables (significance level: *P*<0.05)
- All analyses were performed separately by payor type (commercial vs MA)

RESULTS

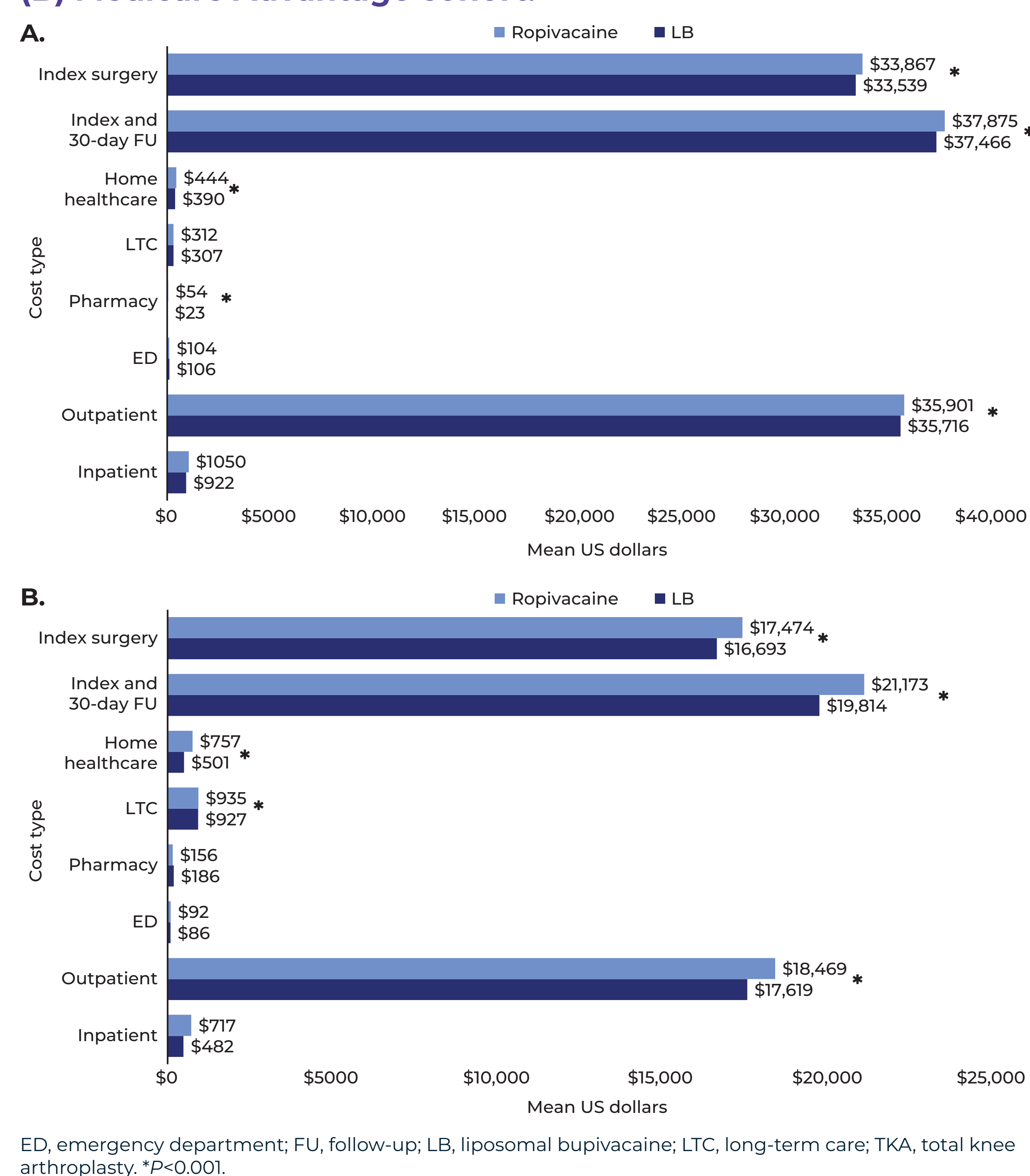
- In the commercial cohort, there were 9463 patients each in the LB and ropivacaine group; for the MA cohort, there were 2924 patients in each group
- Baseline demographics for the LB and ropivacaine groups were well balanced after 1:1 propensity score matching within each payor cohort (Table 1; standardized mean difference, <0.1 [data not shown])
- The mean age was 61 and 71 years, with 57% and 63% being female in the TKA commercial and MA cohorts, respectively (Table 1); ~40% of patients in both cohorts were obese, and at least 20% of patients had diabetes

Table 1. Baseline Demographics of Patients Undergoing TKA

	Commercial cohort		MA cohort	
	LB group (n=9463)	Ropivacaine group (n=9463)	LB group (n=2924)	Ropivacaine group (n=2924)
Age, mean (SD), y	61 (7.5)	61 (7.7)	72 (7.0)	71 (7.3)
Women, n (%)	5432 (57.4)	5419 (57.3)	1845 (63.1)	1859 (63.6)
Race/Ethnicity, n (%)[a]				
Asian	211 (2.2)	236 (2.5)	42 (1.4)	44 (1.5)
Black/African American	556 (5.9)	527 (5.6)	193 (6.6)	201 (6.9)
White	6073 (64.2)	6093 (64.4)	2292 (78.4)	2269 (77.6)
Hispanic	954 (10.1)	910 (9.6)	259 (8.9)	257 (8.8)
Unknown	1668 (17.6)	1697 (17.9)	138 (4.7)	153 (5.2)
Key baseline comorbidities[b]	6.4 (1.0)	6.4 (1.0)	6.4 (1.0)	6.8 (1.0)
COPD	1205 (12.7)	1205 (12.7)	549 (18.8)	564 (19.3)
Diabetes	2208 (23.4)	2201 (23.3)	1109 (37.9)	1120 (38.3)
Obesity	3788 (40.0)	3776 (39.9)	1147 (39.2)	1184 (40.4)
Tobacco use	1288 (13.6)	1265 (13.4)	537 (18.4)	543 (18.6)
Opioid-related disorders	97 (1.0)	80 (0.8)	56 (1.9)	58 (2.0)
Index year of surgery				
2020	1506 (15.9)	1514 (16.0)	369 (12.6)	378 (12.9)
2021	2196 (23.2)	2161 (22.8)	558 (19.1)	547 (18.7)
2022	2365 (25.0)	2441 (25.8)	656 (22.4)	685 (23.4)
2023	2250 (23.8)	2209 (23.3)	915 (31.3)	884 (30.2)
2024	1146 (12.1)	1138 (12.0)	426 (14.6)	430 (14.7)

[a]1 patient receiving ropivacaine identified as Native Hawaiian or other Pacific Islander in the commercial cohort. [b]Comorbidities occurring in >10% of patients or related to pain modification. COPD, chronic obstructive pulmonary disease; LB, liposomal bupivacaine; MA, Medicare Advantage; SD, standard deviation.

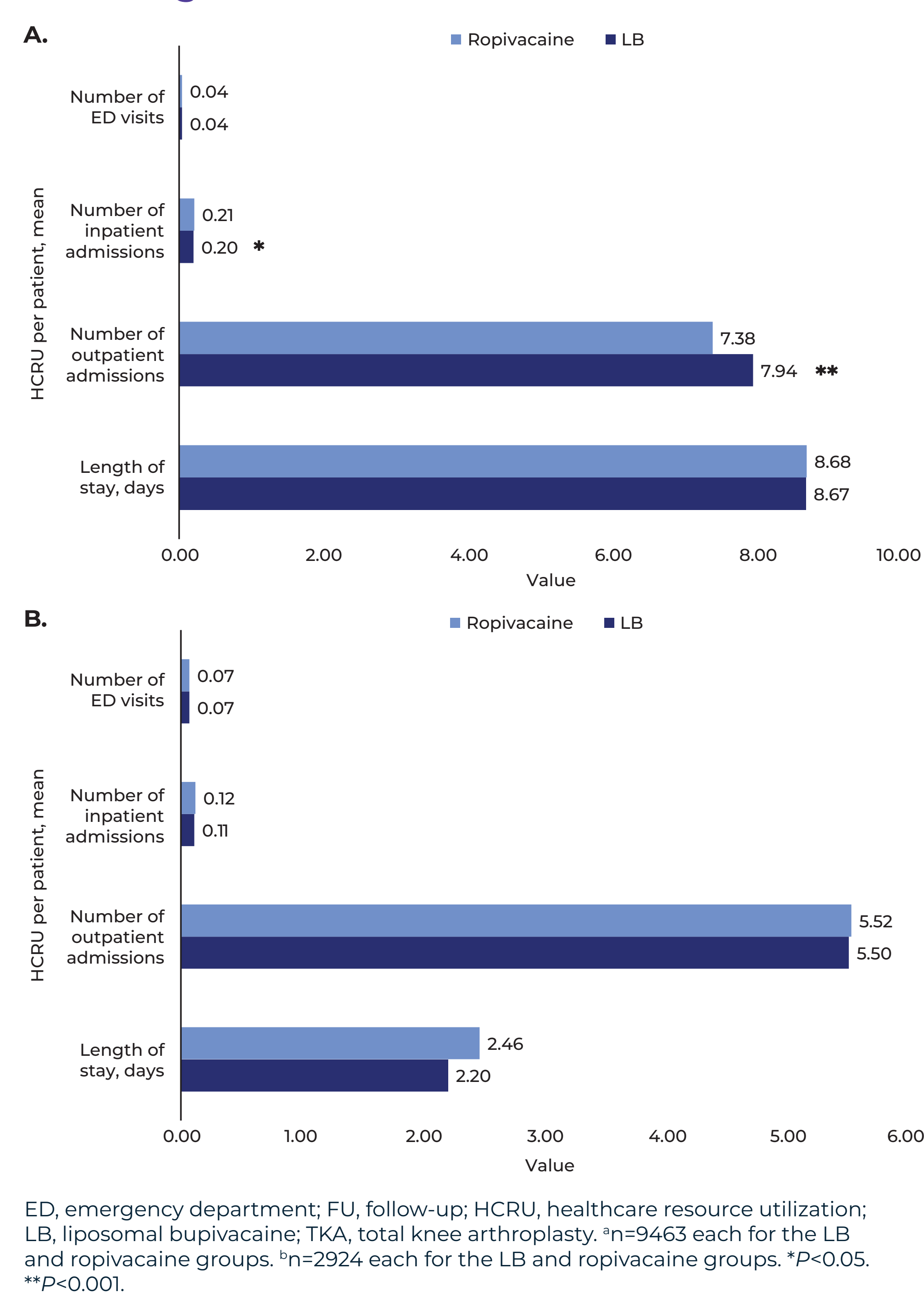
Figure 1. Mean costs per patient by treatment from the index TKA through the 30-day FU in the (A) commercial cohort and (B) Medicare Advantage cohort.



ED, emergency department; FU, follow-up; LB, liposomal bupivacaine; LTC, long-term care; TKA, total knee arthroplasty. **P*<0.001.

- Index surgery costs for LB versus ropivacaine were $33,539 versus $33,867 ($328 savings) in the commercial cohort and $16,693 versus $17,474 ($781 savings) in the MA cohort (*P*<0.001 for all; Figure 1)
- Mean total costs per patient from the index TKA through the 30-day follow-up were significantly lower in the LB versus ropivacaine group for the commercial cohort (−$409 [$37,466 vs $37,875]; Figure 1A) and MA cohort (−$1359 [$19,814 vs $21,173]; *P*<0.001 for all) (Figure 1B)
  - For the commercial cohort, significant decreases in mean total costs per patient were primarily attributable to lower home healthcare (−$54), pharmacy (−$31), and outpatient (−$185) costs for LB-treated patients
  - For the MA cohort, significant decreases in mean total costs per patient were primarily attributable to lower home healthcare (−$256), LTC (−$8), and outpatient (−$850) costs for LB-treated patients
- In the commercial cohort, LB administration resulted in a significantly lower number of inpatient admissions (0.20 vs 0.21; *P*<0.05) but significantly more outpatient admissions (0.06 more; *P*<0.001) from the index TKA through the 30-day follow-up than ropivacaine administration (Figure 2A)
- In the MA cohort, there were no significant differences between LB and ropivacaine with respect to HCRU per patient metrics (Figure 2B)

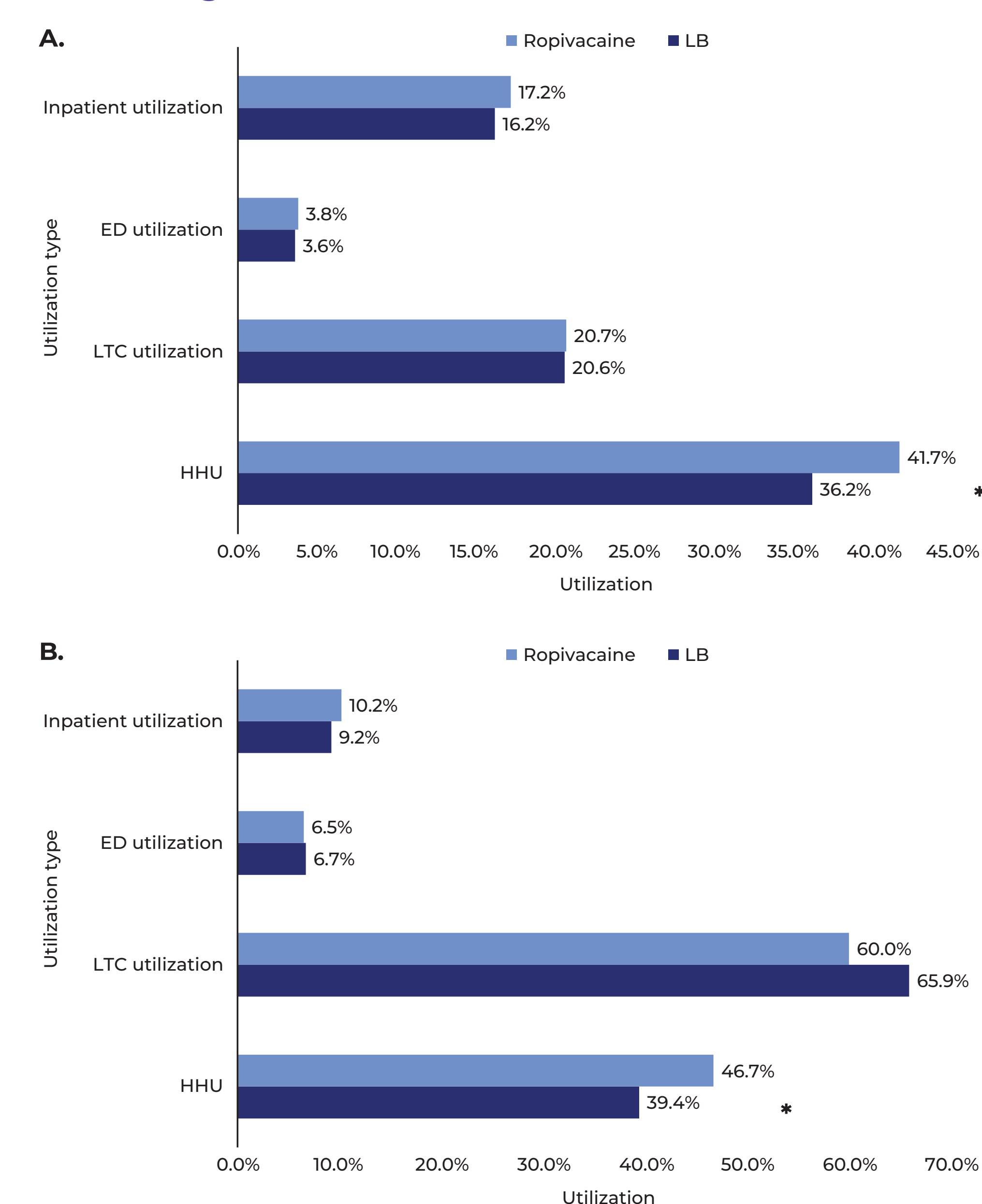
Figure 2. Mean HCRU per patient by treatment from the index TKA through the 30-day FU for the (A) commercial cohort[a] and (B) Medicare Advantage cohort.[b]



ED, emergency department; FU, follow-up; HCRU, healthcare resource utilization; LB, liposomal bupivacaine; TKA, total knee arthroplasty. [a]n=9463 each for the LB and ropivacaine groups. [b]n=2924 each for the LB and ropivacaine groups. **P*<0.05. ***P*<0.001.

- For both insurance cohorts, there were statistically significant differences in HCRU
  - For the commercial cohort, HHU was lower in the LB versus ropivacaine group (36.2% vs 41.7; *P*<0.001), and there were no significant differences between treatment groups for inpatient, ED, or LTC utilization (Figure 3A)
  - For the MA cohort, HHU was significantly lower in the LB versus ropivacaine group (39.4% vs 46.6%; *P*<0.001); in contrast, LTC utilization was higher in the LB versus ropivacaine group (65.9% vs 60.0%; *P*<0.001)

Figure 3. Percent HCRU by treatment from the index TKA through the 30-day FU for the (A) commercial cohort and (B) Medicare Advantage cohort.



ED, emergency department; HHU, home health utilization; LB, liposomal bupivacaine; LTC, long-term care; TKA, total knee arthroplasty. **P*<0.001.

- LB administration resulted in significantly lower HCRU by means of
  - Significantly lower HHU and lower outpatient, pharmacy, and home healthcare costs compared with ropivacaine 30 days after TKA (*P*<0.001 for all) in the commercial cohort
  - Significantly lower HHU and lower outpatient, home healthcare, and LTC costs than ropivacaine, but higher LTC utilization, 30 days after TKA (*P*<0.001 for all) in the MA cohort

DISCLOSURES: Gabriel Wong and Jennifer Lin are or were employees of Pacira BioSciences, Inc. Daniel Goltz has served on a speakers bureau or received an honorarium from Enovis and is a paid employee of the Academic Orthopaedic Consortium.

FUNDING: This study was funded by Pacira BioSciences, Inc. Assistance with poster preparation was provided under the authors' direction by Fingerpaint Medical and funded by Pacira BioSciences, Inc.

REFERENCES: 1. Mansour et al. *The Knee.* 2026;104346. **2.** Gadsden et al. *J Arthroplasty.* 2025;40:2605-2614. **3.** Asche et al. *J Med Econ.* 2019;22(1):85-94.

ADDITIONAL INFORMATION: Additional information can be viewed by scanning the QR code.

Presented at the Orthopaedic Research Society 2026 Annual Meeting; March 27-31, 2026; Charlotte, NC